

MOUNTING ARRANGEMENT FOR THE INTERNAL DIVIDING ELEMENTS OF REFRIGERATORS AND FREEZERS

Field of the Invention

The present invention refers to an arrangement for providing the sliding assembly of internal dividing elements, such as shelves, drawers, and other elements, in simple or combined refrigerators and freezers, in order to allow these internal dividing elements to be selectively, adequately and safely slid in a horizontal direction between a totally retracted position inside a refrigerating compartment of the appliance and a position, defined by travel end stop means and in which they are partially displaced outwardly.

15 Prior Art

The simple or combined refrigerators and freezers comprise one or more refrigerating compartments provided with a front door and with a pair of opposite lateral walls, each carrying at least one support element or rail, on which is seated an adjacent lateral portion of an internal dividing element, in the form of a shelf, a drawer or other elements designed to store food articles to be maintained under refrigeration inside the compartment.

In some constructions, the support elements, which can take the form of projections or rails, are integrally formed with lateral walls of the compartment during the molding of the internal box of the cabinet that defines the refrigeration appliance.

In other constructions, said support elements are manufactured separately and then affixed to the lateral walls of the compartment by any adequate process.

Independently of how they are affixed, the support elements, when defining rails, should present a

construction which allows the horizontal displacement of the shelves or drawers between a retracted position inside the compartment and positions in which they are partially displaced forwardly and outwardly from the  
5 compartment.

In a large number of mounting arrangements, each rail defines an upper track and a lower track, against which are respectively slidably seated a seating surface and a retaining surface, provided in an  
10 adjacent lateral portion of the internal dividing element.

By reason of the dimensional variations, which are invariably present in the internal box of the cabinet, particularly in relation to the distance between the  
15 opposite lateral walls of the compartment along the height thereof, it is necessary that the mounting of the internal dividing elements to the support elements allows, simultaneously, the absorption of said dimensional variations and an adequate sliding of the  
20 internal dividing elements. Therefore, it is usual to provide fitting gaps, in the direction transversal to the sliding movement, which are dimensioned as a function of the maximum dimensional variations. This procedure conducts to an excessively loose sliding of the  
25 internal dividing elements, causing discomfort to the user, who has to take certain cares to obtain the desired sliding of the internal dividing element. This unpleasant operation is particularly critical in the case of drawers and trays, which have their lateral  
30 portions slidably seated on rails provided on the opposite lateral walls of the compartment.

Besides the disadvantage above, these known bearing constructions with large transversal gaps are not provided with travel limiting means for defining a

maximum operational extracting position for the internal dividing elements.

The constructions proposed up to now to provide a safe and comfortable mobility for the internal dividing elements of the type considered herein have resulted in complex constructions, of high cost and little versatility of use. Some of these constructions can be verified in patent documents US 3,456,996 and US 5,366,284. Although guaranteeing a rectilinear slide to the internal dividing elements, these constructions present engaging systems between the movable element and the rails which are complex, relatively fragile, and subject to be stuck.

#### Objects of the Invention

By reason of the disadvantages mentioned above and related to the prior art constructions, it is an object of the present invention to provide a mounting arrangement for the internal dividing elements of refrigerators and freezers, which allows, through a simple and resistant construction of high versatility and low cost, the provision of shelves, drawers and other internal dividing elements which require a safe and comfortable horizontal movement between a retracted position and a maximum operational displacement position forwardly and outwardly from the compartment.

#### Disclosure of the Invention

As previously mentioned, the present mounting arrangement is applied to the internal dividing elements of refrigerators and freezers which comprise a compartment having two lateral walls, each carrying at least one rail on which is slidably seated an adjacent lateral portion of an internal dividing element to be horizontally displaced between a first position, in which it is retracted inside the

compartment, and second positions in which it is partially displaced forwardly and outwardly from the compartment.

According to the invention, each rail comprises a flat horizontal upper track and a lower track, parallel to the upper track and which is provided with at least one stop means and one longitudinal guide rail. Each lateral portion of the internal dividing element comprises a seating surface, to be slidably seated on the upper track of the respective rail, and a retaining surface, disposed below the lower track and which carries a lock, which in an operative position, is slidably seated against the lower track of the same rail, in order to abut said stop means to define a second maximum displacement position of the internal dividing element. At least one of the lateral portions of the internal dividing element further comprises, in distinct regions of the longitudinal extension of the retaining surface thereof, a guide follower which is slidably fitted in the guide rail of the lower track of the respective rail.

The construction defined above allows the internal dividing element to be horizontally slid on the pair of opposite rails, until the pair of lower locks which are provided in the lateral portions of said internal dividing element, reach the respective stop means provided in the lower track of each of said rails, defining the maximum displacement of the internal dividing element forwardly and outwardly from the compartment, preventing said internal dividing element from reaching an unbalance position.

In order to maintain the internal dividing element aligned during its horizontal displacement, independently of the transversal gaps which are necessary to absorb the dimensional variations of the

internal box of the cabinet, the retaining surface of one of the lateral portions of the internal dividing element carries the guide follower slidingly fitted in the guide rail provided in the lower track of the  
5 respective rail, allowing the internal dividing element to maintain a exclusively rectilinear path while it is horizontally moved between its different operational positions.

The gaps resulting from the dimensional variations are  
10 absorbed by the adaptation of the other lateral portion of the internal dividing element on the respective rail and without the interference of a guide follower in the guide rail of the lower track of this rail.

15 Brief Description of the Drawings

The invention will be described below, with reference to the enclosed drawings given by way of example of a possible construction of the present arrangement, and in which:

20 Figure 1 is a front perspective view of a cabinet of a combined refrigerator, whose internal box carries, on one of its lateral walls, a pair of rails for the sliding assembly of the respective internal dividing elements (not illustrated);

25 Figure 2 is a perspective view illustrating an internal dividing element in the form of a shelf, as well as guide elements and lock elements to be operatively associated with the present mounting arrangement;

30 Figure 3 is an elevational lateral view of one of the rails illustrated in figure 1;

Figure 4 is a vertical cross-sectional view of one of the rails already affixed to the adjacent lateral wall of the compartment and onto which is mounted the

adjacent lateral portion of the internal dividing element illustrated in figure 2;

Figure 5 is a longitudinal vertical sectional view taken according to line V-V of figure 4, and  
5 illustrating the internal dividing element seated on the respective rail and displaced to the maximum displacement position forwardly and outwardly from the respective compartment;

Figure 6 is a vertical cross-sectional view similar to  
10 that of figure 4, but illustrating the other lateral portion of the internal dividing element of figure 2 mounted to the respective rail already affixed to the adjacent lateral wall of the compartment;

Figure 7 is a longitudinal vertical sectional view  
15 taken according to line VII-VII of figure 6;

Figure 8 is a partial perspective view of the internal dividing element of figure 2, illustrating its lateral portion represented in figure 7; and

Figure 9 is a partially cut perspective view of the  
20 internal dividing element illustrated in figure 2, showing its lateral portion represented in figure 6.

#### Description of the Detailed Invention

As previously mentioned and illustrated in the enclosed drawings, the present mounting arrangement is directed to refrigerators and freezers having a simple or combined cabinet 10, comprising an external box 11, generally made of a metallic plate, and by at least one internal box 12, which is generally injected in plastic material in a single piece and with a substantially parallelepiped shape, defining a respective compartment C and, between the external box 12 and the internal box 11 is injected a heat insulator 13 generally in polyurethane foam. The compartment C is limited on both sides by lateral walls 14, only one being illustrated in figure 1.

Each of the lateral walls 14 secures at least one rail 20, on which is slidably seated an adjacent lateral portion 30 of an internal dividing element to be horizontally displaced between a first position, in 5 which it is retracted inside the compartment C, and second positions, in which it is partially displaced forwardly and outwardly from the compartment C.

According to the invention, each rail 20, preferably in plastic material, comprises a basic portion 21 to 10 be seated and affixed against a respective lateral wall 14, and a body portion 22 which defines, along its longitudinal extension, a flat horizontal upper track 23 and a lower track 24, parallel to the upper track 23 and which is provided with a longitudinal 15 guide rail 25 extended along the length of said lower track 24 and which, in the illustrated embodiment, takes the form of a downwardly opened groove.

The internal dividing element E in the form of a shelf, tray or drawer, comprises a pair of lateral 20 portions 30 which can be made in different manners. In the case of the shelves, trays or drawers made of injected plastic material, the lateral portions 30 can be formed in a single piece with the remainder of the body of the internal dividing element E. However, in 25 determined constructions, such as for example the shelves made of glass panel, the lateral portions are made in separate pieces to be fitted, or otherwise affixed, along the lateral edges of said panel that defines the shelf. In these constructions and 30 independently of the possibility of the lateral portions being or not incorporated in a single piece to the body of the internal dividing element E, the separate construction of the internal lateral portions 30 allows to provide said elements with an additional 35 versatility, since such lateral portions can be

replaced by other lateral portions which do not present the necessary characteristics for the sliding seating on the rails and which allow only the static seating of the shelf or tray on respective supports  
5 affixed or otherwise provided on the lateral walls 14 of the compartment C.

As better illustrated in figures 4, 6, 8 and 9, each lateral portion 30 of the internal dividing element E comprises a seating surface 31, to be slidably seated  
10 on the upper track 23 of the respective rail 20, and a retaining surface 32 disposed below the lower track 24. This construction, which is basically known, makes each lateral portion 30 of the internal dividing element E to present a "U" shaped cross section, with  
15 the basic leg being vertically disposed and with the internal faces of the lateral legs defining the seating surface 31 and the retaining surface 32, respectively.

The retaining surface 32 of each lateral portion 30 is  
20 provided with a lock 33, which in an operative position, is slidably seated against the lower track 24 of the respective rail 20. The lock 33 is preferably made in a material that accepts a certain resilient deformation, whereby each lock 33 remains  
25 slightly resiliently seated against the lower track 24 of the adjacent rail 20, while the internal dividing element E is horizontally displaced between its different operational positions.

In order to limit the displacement of the internal  
30 dividing element E to an extension which still guarantees an adequate stability for the assembly, preventing said element from being excessively displaced outwardly from its support on its respective rails 20, each lower track 24 is provided with a stop  
35 means 26, which is positioned so as to abut the

respective lock 33 when the internal dividing element E reaches said maximum displacement position.

In the construction illustrated herein, each rail 20 is provided with two stop means, which are 5 longitudinally spaced from each other along the lower track 24, in order to allow the rail 20 to be constructed according to a single standard, independently of the side onto which it will be mounted inside the compartment C. Nevertheless, it 10 should be understood that each rail 20 could be made with one stop means 26 only, which situation would demand the construction of a rail 20 for the left-hand assembly and a rail 20 for the right-hand assembly inside the compartment C.

15 The construction described above allows for a free and safe displacement of the internal dividing element E between the retracted position and the maximum displacement position, independently of the size of the transversal gaps in the assembly established in 20 project. The provision of the locks assures the safe travel end of the internal dividing element E, interrupting its displacement and avoiding the risk of excessively removing the latter from the interior of the compartment. However, the construction described 25 above does not establish a precise guide means which guarantees an exclusively linear displacement of the internal dividing element E when it is manually operated by the user.

Thus, the invention further provides, preferably in 30 only one of the lateral portions 30, a guide follower 35, positioned in distinct regions of the longitudinal extension of the respective retaining surface 32 and which is dimensioned to be slidingly fitted in the guide rail 25 of the lower track 24 of the respective 35 rail 20. Thus, the guide follower 35, which takes

preferably the form of a rib projecting upwardly from the track of the retaining surface 32, operates as a guide element during the horizontal displacement of the internal dividing element E, without the 5 transversal gaps hindering the user from establishing a rectilinear path for the horizontal displacement of the internal dividing element E.

In the construction illustrated in the drawings, the 10 guide rail 25, in the form of a downwardly opened groove, is disposed immediately below the upper track 23 of the respective rail 20, and presents a width which is substantially smaller than that of the respective lower track 24 in which it is incorporated. The locks 33 of the respective lateral portions 30 15 present a width that is sufficient for them to slide against the lower track 24 of the adjacent rail 20, on the groove shaped guide rail 25. Thus, the locks 33 do not interfere with the displacement of the guide followers 35 on the respective guide rails 25 while 20 the internal dividing element E is horizontally displaced between its operational positions. In this same illustrated constructive form, each stop means 26 is defined by a respective step which is cutout from the profile of the lower track 24 of the respective 25 rail 20. Thus, when the internal dividing element E is displaced from the retracted position to the maximum displacement position outwardly from the compartment C, the locks 33 slide along the lower track 24, until reaching the respective steps provided in a recess 30 which is cut in the lower track 24 itself, when the fingers 33, which are constantly resiliently forced against the lower tracks 24, are conducted to the interior of the recesses, in which are produced the steps that define the stop means 26, such as 35 illustrated in figures 5 and 7.

As already mentioned, each lock 33 is made in such a way as to be resiliently bent. Thus, for dismounting the internal dividing element E from the interior of the compartment C, the user needs only to provide the 5 selective manual displacement of the locks 33 from the operative position, in which they actuate against the stop means 26, to an inoperative position, in which they no longer abut the steps 26 of the lower track 24 of the respective rail 20, when the internal dividing 10 element reaches its second maximum displacement position.

In the embodiment illustrated in the drawings, the lateral portions 30 are incorporated, in a single piece, to the internal dividing element E, and the 15 retaining surface 32 is defined by a median longitudinal extension of the respective lateral portion 30 of the internal dividing element E, which is maintained slidably seated against the lower track 24 of the rail 20. In the illustrated embodiment, the 20 retaining surface 32 is defined by an insert fitted in the lower lateral leg of the respective lateral portion 30 of the internal dividing element, and the lock 33 is defined by a cutout portion which is bent upwardly from said retaining surface 32.

25 In this preferred construction, the guide follower 35 is incorporated to the retaining surface 32 and comprises two portions, each longitudinally disposed on one of the sides of the lock 33, said portions of the guide follower comprising longitudinal elements to 30 be slidably fitted in the guide rail 25 provided in low relief in the adjacent lower track 24 of the respective rail 20.

While only one construction has been illustrated herein, it should be understood that changes in the 35 form and arrangement could be made, without departing

**from the constructive concept defined in the appended claims.**